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# CRS Report for Congress

## China - U.S. Cooperation: Military Sales, Government Programs, Multilateral Aid, and Private-Sector Activities

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**CHINA - U.S. COOPERATION:  
MILITARY SALES, GOVERNMENT PROGRAMS,  
MULTILATERAL AID, AND PRIVATE-SECTOR ACTIVITIES**

**SUMMARY**

In China, the violent suppression of peaceful public protests by armed military forces beginning June 3, 1989 has led to efforts by U.S. policymakers to re-examine existing U.S. cooperation with China. On June 5, President Bush announced five steps in response to the Chinese Government's suppression of the demonstrations: suspension of all government-to-government military sales and commercial exports of military materials; suspension of exchange visits by U.S. and Chinese military personnel; extension of assistance to the Red Cross for its work in China; sympathetic review of requests by Chinese students studying in the United States to extend their visits; and a review of other U.S.-China programs and activities.

U.S. cooperation with China is conducted through both government channels and private sector activities. At the government level, cooperation encompasses agreements on military, nuclear power, trade, and science and technology matters. While not providing military assistance, the United States has sold China \$602 million in arms since FY 1984. Of this amount \$79 million has been delivered. Weapons valued at \$195 million have also been delivered through commercial sales. President Bush's announcement to suspend arms transfers to China would hold up new government sales agreements as well as the delivery of previously agreed-to items.

While the United States does not maintain a formal foreign aid program for China, the U.S. Government is involved in a number of bilateral and multilateral programs that benefit China. Among these are the Overseas Private Investment Corporation, an upcoming Peace Corps mission to China, the World Bank, the Asian Development Bank, and a substantial science and technology cooperation program. China was the largest beneficiary in 1988 of the Export-Import Bank and the Trade and Development Program -- two U.S. programs that are primarily designed to bolster American exports worldwide. China maintains most-favored-nation trading status with the United States and has received a more relaxed export control designation in recent years. The United States and China also conduct extensive and growing cultural and educational exchanges.

American businesses in China are involved in an array of equity joint-ventures, licensing agreements, technology transfer, and coproduction agreements. China ranks as 13th among U.S. trading partners with two-way trade in 1987 totalling \$10.4 billion and estimated at over \$13 billion in 1988.

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## **CHINA - U.S. COOPERATION: MILITARY SALES, GOVERNMENT PROGRAMS, MULTILATERAL AID, AND PRIVATE-SECTOR ACTIVITIES**

In China, the violent suppression of peaceful public protests by fully armed military forces beginning June 3, 1989 has led to efforts by some U.S. policymakers to examine what options may be available to the United States to impose sanctions against China's current leadership. This report sets out the range and costs of U.S.-Chinese cooperation in a number of areas, including military sales, aid and trade programs, and private sector activities, and notes, where possible, cooperative activities that are currently under review or pending approval.<sup>1</sup>

Any attempt to compile the extent of U.S. cooperation, investment, and involvement with China is limited by several factors. One limitation is imposed by the decentralized way in which U.S. Government cooperation and involvement with China is both conducted and recorded. A number of readily available government-to-government agreements have been signed which define the broad parameters of this cooperation. But to a great extent, the actual details of U.S.-China cooperation are carried out by departments and other sub-groups of various U.S. Government agencies, with the costs attributed to a multitude of programs within those agencies. Thus, assessing the true extent and value of U.S. Government cooperation with China would entail an extensive review of a wide range of U.S. Government activity, almost on a program-by-program basis. This report, then, discusses the major aspects of U.S.-China activity without attempting to offer a complete picture or a total dollar figure.

Information is also limited by the fact that government-company or company-company involvement between the U.S. private sector and entities in China is difficult, if not impossible, to compile completely. Statistics on the involvement of U.S. companies with Chinese concerns are not centrally collected in the United States, and what limited Chinese statistics exist may be unreliable and of little use. There are U.S. lists available of U.S.-China joint ventures, including the companies involved. On an irregular basis, there are also lists available of U.S.-funded projects in China involving either Chinese entities or U.S. businesses, such as those funded, for example, through the Department of Energy or the Environmental Protection Agency.

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<sup>1</sup> In addition to sources cited throughout this report, much of the data are drawn from various U.S. Government, World Bank, Asian Development Bank, and United Nations documents, as well as from telephone interviews conducted with officials of these agencies and organizations.

In addition, a number of organizations in the United States, most prominently the U.S.-China Business Council in Washington, have compiled selective lists of major U.S.-China business involvement.

On June 5, President Bush announced that the United States would take five steps in response to the Chinese Government's suppression of the demonstrations: suspension of all government-to-government military sales and commercial exports of military materials; suspension of exchange visits by U.S. and Chinese military personnel; extension of assistance to the Red Cross for its work in China; sympathetic review of requests by Chinese students studying in the United States to extend their visits; and a review of other U.S.-China programs and activities.

## U.S. GOVERNMENT ACTIVITIES AND PROGRAMS

### BACKGROUND

Beginning in the late 1970s, the United States has conducted an ongoing program of military and defense cooperation with China. This cooperation eventually included the periodic sale of military equipment and services through the U.S. Foreign Military Sales (FMS) program.

In addition, beginning in 1979 the United States has signed a series of bilateral agreements with China governing a range of non-military issues, including an agreement on nuclear cooperation, various agreements on trade and commerce, and a comprehensive agreement on science and technology cooperation. This latter agreement includes at least 29 separate protocols, negotiated and signed over the years by various U.S. Government agencies, which together have fostered an extensive range of U.S.-China scientific cooperation.

Beyond these agreements, several others have been signed or have gone into effect since the beginning of calendar year 1988. These include: a new work program and six grant agreements, signed in Washington on May 11, 1988, at the conclusion of the 6th session of the Sino-U.S. Joint Commission on Commerce and Trade; and an agreement on textile trade (the third such agreement), signed in Beijing on February 2, 1988. A significant omission from the list of signed U.S.-China agreements is a bilateral investment treaty, which would codify U.S. investor rights in China. Although negotiations have been ongoing for several years on such a treaty, an agreement has yet to be concluded.

Appendix A contains a list of U.S.-China treaties and agreements. It also includes a list of the 29 separate protocols of the science and technology agreement, along with notation of the 19 signatory U.S. Government agencies.

## U.S. MILITARY COOPERATION AND ARMS SALES TO CHINA

The United States has had an ongoing program of military and defense cooperation with China since before normalization of U.S.-China relations in 1978. Since normalization, a number of the important events in U.S.-China relations appear to have significance for defense cooperation:

- January 1980 -- the U.S. Government announced that China would be allowed to buy U.S. items with potential military applications
- February 1983 -- Secretary of State Shultz conducted 4 days of talks with Chinese officials, including Deng Xiaoping, on technology transfer and military cooperation, among other things
- May 1983 -- China was deemed to be a "friendly, non-aligned country" for the purpose of buying advanced U.S. technology
- September 1983 -- Secretary of Defense Weinberger made a conditional offer to sell China certain defensive weapons systems
- July 1984 -- Defense Minister Zhang Aiping discussed with U.S. officials Chinese purchases of U.S. weapons and military technology
- August 1984 -- Secretary of the Navy Lehman announced he had laid a foundation for future U.S.-China military cooperation
- January 1985 -- General John Vessey, Chairman of the Joint Chiefs of Staff, met with Chief of General Staff Yang Dezhi and other Chinese military officials

While the United States does not extend any military assistance to China, the periodic sale of small quantities of military equipment has been a more recent part of the ongoing U.S. program of defense cooperation with China. Since 1955, the U.S. Government on a cash basis has made government-to-government arms sales to China under the Foreign Military Sales (FMS) program, while other American arms exporters have obtained approval for commercial sales through the State Department Office of Munitions Control (OMC). The value of FMS agreements signed between the U.S. and China totals \$602 million (see table, next page), although only \$79 million of the

equipment has been delivered.<sup>2</sup> Another \$195 million in arms have been delivered through commercial sales. President Bush's announcement on June 5, 1989 to suspend arms transfers to China would hold up new FMS agreements as well as the delivery of previously agreed-to government sales and an estimated \$81 million in commercial exports in FY 1989.

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Government (FMS) and Commercial Arms Sales to China  
(millions of dollars)

	FY84	FY85	FY86	FY87	FY88	FY89	FY90
<u>Agreements:</u>							
FMS	0.6	0.4	36.1	550.7	14.2	0.41 <sup>a</sup>	10.0 <sup>b</sup>
Commercial	NA	NA	NA	NA	NA	NA	NA
<u>Deliveries:</u>							
FMS	<sup>c</sup>	0.4	0.5	3.9	39.3	35.4 <sup>d</sup>	NA
Commercial	22.7	46.3	55.2	24.4	43.0	81.2 <sup>b</sup>	48.7 <sup>b</sup>

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<sup>a</sup>Actual agreements as of May 31, 1989. Total agreements for FY89 were estimated at \$100 million.

<sup>b</sup>Estimate.

<sup>c</sup>Less than \$50,000.

<sup>d</sup>Actual deliveries as of May 31, 1989.

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In addition to military sales, the United States several years ago began assisting China's People's Liberation Army (PLA) in planning for a Chinese National Defense University (NDU) similar to that which is in the United States. The PLA-NDU, located outside of Beijing, opened its doors on September 1, 1986. Since that time, it has maintained close relations with its counterpart university in the United States. The extent of U.S. involvement includes: regular exchanges of professors; rotating bilateral conferences; routine exchanges of library texts and materials; field studies trips; and periodic hosting of research fellows. According to a U.S. NDU official, the

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<sup>2</sup> Major U.S. military equipment sold to China in recent years include:

- 24 Sikorsky helicopters (\$100+ million - commercial sale)
- artillery ammunition (\$98 million - FMS sale)
- aircraft avionics (\$550 million - FMS sale)
- MK46 torpedoes (\$8.5 million - FMS sale)
- Firefinder radar (\$62.5 million - FMS sale)
- 6 Boeing Chinook helicopters (\$100 million - commercial sale agreement)



costs for such exchanges are reciprocal, with in-country expenses covered by the host university and transportation costs paid by the parent university. Functional exchanges under this program will be affected in accordance with President Bush's June 5 announcement that contacts between U.S. and Chinese military personnel have been suspended.

## ECONOMIC ASSISTANCE PROGRAMS

China receives assistance from a few U.S. programs as well as from a wide range of multilateral organizations of which the United States is a member and provides financial support. The United States does not maintain a formal bilateral foreign assistance program with China, although a U.S. Peace Corps mission in China is scheduled to begin in August 1989.

### Bilateral Assistance

#### *Agency for International Development (AID)*

The U.S. Agency for International Development, the primary agency responsible for bilateral American economic aid, maintains no programs with China. Prior to 1985, China, as a communist country, was prohibited from receiving any assistance provided under the Foreign Assistance Act of 1961. Using a waiver authority,<sup>3</sup> the Reagan Administration removed China from the list of ineligible Communist nations on December 11, 1985. In a letter to Congress, however, then-Assistant Secretary of State for Legislative Affairs, William Ball, stated that the Administration had no intention of instituting a bilateral aid program for China. The letter indicated that officials were giving consideration to include Chinese participation in some ongoing multilateral activities funded by AID, but that Congress would be informed prior to taking any action. AID has yet to include China in any such agency-supported multilateral programs.

FOIA

### *Peace Corps*

Following lengthy negotiations, U.S. and Chinese officials signed an agreement on April 5, 1989 to establish a Peace Corps mission in China. The first group of American trainees is scheduled to arrive in China on August 14, 1989 where they will teach English in Sichuan Province. The Peace Corps has not altered its plans for initiating the China program, but will continue to review the situation as the August departure date approaches. For FY 1989, the Peace Corps estimates that the China program will cost \$477,000 and include 20 trainees. The proposed budget for FY 1990 is \$893,000, an amount that would support 35-40 Peace Corps volunteers.

FOIA  
P. 1

### *Overseas Private Investment Corporation (OPIC)*

The Overseas Private Investment Corporation, a U.S. Government-owned corporation that facilitates the participation of American private capital in the development of Third World countries through the issuance of political risk insurance and investment financing, was authorized to back investments in China in 1980 and began insuring activities in 1983. As of December 31, 1988, outstanding OPIC insurance liability for projects in China totaled \$95.5 million. For FY 1988, OPIC wrote insurance for 11 investments in China with a total liability of \$46 million. Appendix B lists OPIC insured investments in China during FY 1988.

### **Multilateral Assistance**

The United States is a member of numerous international organizations and lending institutions that provide technical and financial assistance to China. U.S. contributions, as well as those of other donors to these organizations are provided in support of general activities of the agencies and are not tied to programs for specific recipient countries. All figures cited below represent total assistance extended to China by these multilateral institutions, of which U.S. contributions represent only a portion.<sup>4</sup>

### *World Bank*

China, which received its first credit from the World Bank in 1981, has been a growing recipient of Bank loans in recent years. Through its three affiliates<sup>5</sup> the World Bank has provided China with over \$8.5 billion. Of the approximately \$2.1 billion estimated for China in FY 1989, the Bank has approved about \$1.2 billion.

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<sup>4</sup> U.S. appropriations for the multilateral development banks are provided generally, but not always, on an annual basis and are determined by the size of each bank's current replenishment agreement, arrearages from past years, and competing U.S. foreign assistance requirements. For the World Bank affiliates, Congress appropriated in FY 1989 \$50 million for the International Bank for Reconstruction and Development, \$995 million to the International Development Association, and \$4.9 million for the International Finance Corporation. Congress did not appropriate any funds for the Asian Development Bank's "hard loan window" for FY 1989.

<sup>5</sup> The three affiliates are: the International Bank for Reconstruction and Development (IBRD) which extends credits at market interest rates; the International Development Association (IDA), the "soft-loan window" of the World Bank offering interest-free loans with a service charge of 0.75 percent; and the International Finance Corporation, the arm that promotes private sector growth in developing countries.

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World Bank Lending to China  
(millions of dollars)

	<u>cumulative</u> <u>through FY87</u>	<u>FY88</u>	<u>FY89</u> <u>approved*</u>	<u>FY89</u> <u>estimates</u>
IBRD	36,400	1,050	730	1,300
IDA	2,160	640	520	760
IFC	18	27	3	--
Total	5,578	1,717	1,253	2,060

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\*As of June 5, 1989.  
Source: World Bank.

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### *Asian Development Bank*

China first received loans and technical aid from the Asian Development Bank in FY 1987. All lending to China has been through the Bank's market rate channel. ADB assistance to China has grown steadily over the past two years -- from \$131 million to \$283 million -- and had been scheduled to rise to about \$400 million this year. Only a small portion of that amount, however, has been approved, and the Bank reports that five projects for China, totaling nearly \$338 million, were scheduled for consideration in June and July 1989. Bank action on these loans has been postponed.

### *International Monetary Fund*

Since taking its seat in the IMF on April 17, 1980, communist China has entered into two Stand-By Arrangements with the Fund (such Arrangements provide a country access to line of credit from the IMF, contingent on meeting certain economic conditions set out by the Fund). The most recent Arrangement -- totaling 598 million SDRs<sup>6</sup> -- was signed on November 12, 1986.

### *U.N. Development Program (UNDP)*

China, which began receiving assistance from the U.N. Development Program in 1979, is currently the largest UNDP recipient worldwide.

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<sup>6</sup> Special Drawing Rights, the IMF unit of account.

Through 1985, UNDP expenditures in China totaled \$91.8 million. The present multiyear technical cooperation agreement between China and UNDP, scheduled to run through 1990, is estimated at \$184 million, including \$21 million from third country cost-sharing contributions. As of June 5, 1989, about 60 UNDP projects were at an advanced stage of formulation and/or negotiation with the Chinese Government. Approval of these projects had been expected in 1989.

### *Other International Organization Programs*

China receives relatively small levels of assistance from a wide range of U.N. programs and other international organizations, including the International Atomic Energy Agency, the International Fund for Agricultural Development, the U.N. Children's Program, the U.N. Fund for Population Activities,<sup>7</sup> the U.N. High Commissioner for Refugees, and the World Food Program. Combined resources for China from all of these agencies totaled in excess of \$47 million in 1988.

### *Trade Related Programs*

In an effort to bolster American exports, a number of U.S. Government agencies conduct programs designed to promote American trade worldwide, including trade with China. Activities in China for two such agencies -- the Export-Import Bank and the Trade and Development Program -- have grown considerably in recent years. All such assistance, however, goes to U.S. firms, and not to Chinese entities. In addition, China became eligible for certain kinds of Commodity Credit Corporation financing in 1978,<sup>8</sup> although China has not drawn on these credits. Beyond these programs, China maintains most-favored-nation (MFN) trading status with the United States. The President, however, must annually waive the restrictions in the Jackson-Vanik amendment that condition MFN status to communist nations based on relaxed and open emigration policies. China is also placed in country group V for export control purposes, the least-restrictive category that includes most non-communist countries.

### *Export-Import Bank*

The Export-Import Bank, an agency tasked with financing and promoting U.S. exports through the issuance of credits, guarantees, and insurance to

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<sup>7</sup> The United States suspended contributions to the U.N. Fund for Population Activities in 1985 due to the organization's involvement in China's family planning programs which the President determined to include practices of coercive abortion.

<sup>8</sup> Section 202 of the Agricultural Trade Act of 1978 (P.L. 95-501).

American businesses, made its first two loans involving China in FY 1981.<sup>9</sup> Three other loans for exports to China occurred in FY 1986-87, bringing the total amount of Eximbank activity related to China to \$159 million. Loan assistance for American exports to China increased markedly in FY 1988 when the Bank issued 5 loans at a value of \$190 million. China represented about 28% of all Eximbank loans last year making it the Bank's largest beneficiary.

In FY 1989, China is again a leading participant in Eximbank lending. As of June 5, 1989, the Bank had approved \$147.6 million in loans to assist U.S. exports to China, and a number of new cases involving China are pending. One loan, valued at \$11.7 million, is waiting for final authorization. The Eximbank has granted preliminary commitments for another four loans, totaling \$115 million, and is considering preliminary commitments for 11 other cases, valued at \$394.5 million. See Appendix C for details on Eximbank lending activities for China.

### *Trade and Development Program*

The Trade and Development Program (TDP), a U.S. agency funded within the foreign assistance program, is designed to both promote economic development in Third World countries by supporting feasibility studies, consultancies, and training activities, as well as to stimulate U.S. exports that might follow from the feasibility studies and other TDP planning services.

TDP activities in China began in FY 1983 and soon became a significant focus of TDP work. Through FY 1987, the TDP had funded 44 projects in China at a cost of \$15.9 million -- a level representing more than 16 percent of all TDP appropriations up to that point. Last year, the TDP program in China was the agency's largest, at \$6.7 million in support of 29 projects, and represented 29 percent to total TDP activities. Thus far in FY 1989, the TDP has approved four projects in China with a value of \$2.7 million. The TDP estimates that its program in China has resulted in about \$250 million in direct U.S. exports, and estimates that by the year 2010, TDP funding will lead to over \$1 billion in American exports to China. See Appendix D for a list of TDP activities in China.

### *Most-Favored-Nation (MFN) Status*

Since February of 1980, China has been extended MFN trade status, a position the United States offers most of its trading partners. For communist countries, MFN status is subject to freedom-of-emigration restrictions imposed by the Jackson-Vanik amendment to the Trade Act of 1974. The President may issue waivers of the Trade Act restrictions for individual countries.

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<sup>9</sup> China's eligibility for Eximbank loans is contingent on a Presidential waiver of the Jackson-Vanick amendment. See discussion under most-favored-nation status section.

contingent on the annual extensions of this waiver authority. Such extensions and the existing waivers become effective automatically if Congress, within 60 days, does not disapprove such action by the adoption of a resolution in either House.<sup>10</sup> President Carter issued the waiver for China in late 1979, which was extended annually by subsequent Presidents. President Bush submitted the most recent extension of the Jackson-Vanik waiver for China on May 30, 1989, initiating a congressional review period that runs for 60 days from the expiration date of the current waiver (July 2, 1989) until August 31.

### ***Technology Transfer and Export Controls***

Export controls on high technology products to China have been gradually relaxed since enactment by Congress of the Export Administration Act of 1977. That Act stated for the first time that U.S. trade policy did not have to be equally restrictive toward all communist countries but could vary instead from one to another based on considerations deemed appropriate by the President. The legislation facilitated a subsequent decision by the Carter Administration in April 1980 to move China to a less restrictive trade classification for technology purposes. Building on this action, the Reagan Administration further relaxed export controls for China in June 1983 when China was shifted to the "Country Group V" export control category -- but with the continuance on an expedited basis of national security reviews of all license applications. Group V includes most friendly Asian, African, and European countries. By October 1985, the United States had reached agreement with the 20 members of the Coordinating Committee for Exports to communist countries (COCOM),<sup>11</sup> which helped to speed further U.S. and other COCOM member technology exports to China.

Since 1982, both the number of applications and the dollar value for U.S. export licenses to China have grown significantly, peaking in 1985 at over 8,600 applications and \$5.5 billion worth of approved licenses. In 1988, the United States received more than 5,700 applications and approved \$2.9 billion worth of export licenses. U.S. high-technology exports to China also rose rapidly -- the Commerce Department estimates them to have grown from \$630 million in 1982 to a high of \$1.72 billion in 1988.

Recently, the United States conducted a review of measures to further liberalize technology exports to China. This review was suspended, however, in October 1987 when Iran launched an attack on a U.S.-flagged tanker with

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<sup>10</sup> The Jackson-Vanik amendment was enacted prior to the 1983 Supreme Court decision (*INS v. Chada*) which found legislative vetoes to be unconstitutional. Congress subsequently has neither amended the Jackson-Vanik provision nor adopted a resolution disapproving a waiver under the amendment.

<sup>11</sup> Members of COCOM include Japan and all of NATO except Iceland.

a Chinese-made Silkworm missile. The review resumed following Foreign Minister Wu Xueqian's visit to the United States in March 1988.

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U.S. Export Licenses Approved for China

<u>Year</u>	<u>Number of Applications</u>	<u>Total Dollar Value</u>
1982	2,020	\$0.5 billion
1983	2,834	\$0.9 billion
1984	4,443	\$2.0 billion
1985	8,637	\$5.5 billion
1986	6,157	\$3.4 billion
1987	5,777	\$2.3 billion
1988	5,724	\$2.9 billion

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Source: Department of State

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**U.S.-China Science and Technology Cooperation**

Individual protocols under the U.S.-China agreement on scientific cooperation are managed by different U.S. Government agencies, including: the Departments of Agriculture, Education, Energy, Transportation, Commerce, Interior, and Housing and Urban Development; the Nuclear Regulatory Commission; the Environmental Protection Agency; and NASA, among others. Each of these agencies conducts and funds a range of programs with China under the protocols within their jurisdiction.<sup>12</sup>

For instance, under the Understanding on Agricultural Exchange, signed in 1978, the U.S. Department of Agriculture's Soil Conservation Service has sent over a dozen different teams to China to investigate various aspects of soil and water conservation that could be applicable to conditions in the United States, including: soil erosion, sediment control, irrigation, and drainage and salinity management. Under the Protocol on Cooperation in the Field of Management of Industrial Science and Technology, signed in May of

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<sup>12</sup> A survey, though not a complete list, of the kinds of activities conducted under these scientific cooperation programs can be found in: U.S. Congress, Committees on Science, Space, and Technology, and Foreign Affairs, Science, Technology, and American Diplomacy, Joint Committee Print, July, 1987. For list of other U.S. Government funded projects, see also: U.S. Office of Technology Assessment, Energy Technology Transfer to China, September 1985.

1979, the U.S. Commerce Department's International Trade Administration has sponsored jointly with China the National Center for Industrial Science and Technology Management Development, at Dalian, China, to train Chinese senior managers.

### U.S.-China Cultural and Educational Exchanges

On January 31, 1979, the United States signed a Cultural Agreement with China which, like the science agreement, has established a basis for long-term official exchange. According to the agreement, the U.S. Information Agency is charged with managing the U.S.-China cultural exchange program. The agreement, however, governs only official, government-to-government contacts, and neither precludes nor covers other U.S.-China cultural exchanges which may be privately sponsored. As has occurred under many official U.S.-China agreements, costs of the official cultural exchange programs have been reciprocal, with each country covering the costs of its own involvement.

In addition to these areas of exchange and cooperation, the United States each year hosts thousands of Chinese students in this country. It has been estimated that as many as 40,000 Chinese students are now studying in the United States -- outnumbering students from any other country.<sup>13</sup> Under recent measures announced by President Bush, the U.S. Government will "sympathetically review" the requests of any of these students to extend their stays in the United States because of the current conflict in China.

## PRIVATE SECTOR ACTIVITIES

### INVESTMENT AND LICENSING AGREEMENTS

The "joint venture" is one of the vehicles preferred by the Chinese for encouraging foreign investment in China. The very first U.S.-China joint venture contract was signed in October, 1979, by ES Development Company and a Chinese entity, CITS, to build the Great Wall Hotel in Beijing. In April, 1982, the first U.S. manufacturing joint venture contract was approved, between Foxboro Co. and the Shanghai Instrument Industry Company.

Statistics appear to vary about how many U.S.-China joint ventures actually exist. A recent study prepared for the Foreign Commercial Service (FCS) of the U.S. Embassy in Beijing lists 194 U.S.-China joint ventures, including partner names, commitment levels, equity shares, business scope, and

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<sup>13</sup> For further information, see Leo Orleans, Chinese Students in America, 1988.



current status.<sup>14</sup> But, a publication prepared by the American Embassy in Beijing, *Foreign Economic Trends* (1987), claims that the Chinese estimate there are 272 U.S. joint ventures in China, totalling \$1.7 billion in U.S. investment, excluding another \$1 billion in U.S. offshore oil development investment.

In addition, China has entered into significant numbers of licensing agreements with U.S. firms. There appears to be no "set" format for licensing agreements; some involve entire processes, others the manufacture of just one piece of equipment.<sup>15</sup> The most recent list readily available dates from 1983, and it is included in Appendix E.

Private U.S. investment in China, while often widely publicized, is perhaps the most difficult area in which to compile information. Much of this private sector activity involves relatively small business deals; in some cases, however, the activity is extensive and far-reaching.

A recent example of the latter involves the proposed launch of U.S. satellites on Chinese launch vehicles. On September 12, 1988, the U.S. Department of State notified Congress of the Administration's intent to approve export licenses for the commercial launch of U.S.-made satellites on the Chinese Long March launch vehicle. The export license request required and received congressional review and approval. At congressional hearings held on the export license question in September, 1988, the Administration stated that its decision to approve the export license applications was subject to the successful conclusion of three separate government-to-government agreements with China to assure security of U.S. technology; adequate and appropriate insurance liability; and fairness in trade and pricing practices. These three agreements have now been negotiated and signed.

## U.S. TRADE WITH CHINA

China is the United States' 13th largest trading partner. As reported by the International Monetary Fund, the dollar value of U.S.-China two-way trade (both exports and imports) nearly doubled between 1981 and 1987, from \$5.6 billion to \$10.4 billion.<sup>16</sup> This was largely because of significant increases in the dollar value of U.S. imports from China, which more than tripled over this time period. Many U.S. businesses, in fact, complain about what they see

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<sup>14</sup> The National Council for United States-China Trade. *U.S. Joint Ventures in China: A Progress Report*.

<sup>15</sup> See Martin Weil. *Licensing*. *The China Business Review*. November-December 1983. p. 36.

<sup>16</sup> See International Monetary Fund. *Direction of Trade Statistics Yearbook*. 1988.

as the difficulty of gaining access to China's domestic market. While fairly obvious problems may account for some of this (such as the language barrier), the Chinese government also continues to restrict foreign companies' access to its market by a number of market and administrative controls. Among these are: tariffs and import regulatory taxes; import and export licensing requirements; and import substitution regulations.

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**U.S.-China Trade**  
(in millions of dollars)

	<u>1986</u>	<u>1987</u>	<u>1988</u> <u>Projection</u>
U.S. Exports to China (FAS)	3,106	3,497	5,250
U.S. Imports from China (CIF)	5,240	6,911	8,300
U.S.-China Trade Balance	-2,134	-3,413	-3,050
U.S. Share of Chinese Exports (%)	15.7	16.3	16.2
U.S. Share of Chinese Imports (%)	7.8	8.8	10.9

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Source: U.S. Government.

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## APPENDIX A

### U.S.-CHINA TREATIES AND AGREEMENTS

#### Treaties and International Agreements

##### ATOMIC ENERGY

Protocol on cooperation in nuclear safety matters. Signed at Washington October 17, 1981; into force October 17, 1981. TIAS 10217.

Amendment and extension:  
September 26, 1986.

Agreement for cooperation concerning peaceful uses of nuclear energy, with annexes and agreed minutes. Signed at Washington July 23, 1985; entered into force December 30, 1985. TIAS

##### AVIATION

Agreement relating to civil air transport, with annexes and exchanges of letters. Signed at Washington September 17, 1980; entered into force September 17, 1980. TIAS 10326.

Amendment:  
August 19, 1982 (TIAS 10405).

Memorandum of agreement for technical cooperation in the field of civil aviation, with annex. Signed at Washington March 14, 1986; entered into force March 14, 1986. TIAS

##### CLAIMS

Agreement concerning the settlement of claims. Signed at Beijing May 11, 1979; entered into force May 11, 1979. 30 UST 9337. TIAS 9306.

Amendment:  
September 28, 1979 (31 UST 2596; TIAS 9675).

##### CONSULS

Agreement on the mutual establishment of consular relations and the opening of consulates general with annex. Signed at Washington January 31, 1979; entered into force January 31, 1979. 30 UST 17. TIAS 9177.

Consular convention, with exchange of notes. Signed at Washington September 17, 1980; entered into force February 19, 1982. TIAS 10209.

Agreement modifying the consular convention of September 17, 1980. Exchange of notes at Beijing January 17, 1981; entered into force February 19, 1982. TIAS 10209.

Agreement concerning the establishment of additional consulates general. Exchange of notes at Washington September 17, 1980; entered into force September 17, 1980. TIAS

Agreement concerning the establishment of additional consulates general, with annex and related letter. Exchange of notes at Beijing June 16, 1981; entered into force June 16, 1981. TIAS

Agreement concerning the enlargement of existing consular districts. Exchange of notes at June 16, 1981; entered into force June 16, 1981. TIAS

##### CULTURAL RELATIONS

Cultural agreement. Signed at Washington January 31, 1979; entered into force January 31, 1979. 30 UST 26. TIAS 9178.

##### FISHERIES

Agreement concerning fisheries off the coasts of the United States, with annexes and agreed minutes. Signed at Washington July 23, 1985; entered into force November 19, 1985. TIAS

Amendment:  
July 24 and August 6, 1987.

##### INDUSTRIAL AND TECHNOLOGICAL COOPERATION

Agreement on industrial and technological cooperation. Signed at Washington January 12, 1984; entered into force January 12, 1984. TIAS

##### INVESTMENT GUARANTIES

Agreement relating to investment guarantees, with related notes and statement. Exchange of notes at Beijing October 30, 1980; entered into force October 30, 1980. 32 UST 4010. TIAS 9924.

##### MARITIME MATTERS

Agreement concerning maritime search and rescue cooperation. Signed at Washington January 20, 1987; entered into force January 20, 1987. TIAS

##### POSTAL MATTERS

Parcel post agreement, with detailed regulations. Signed at Washington October 9, 1980; entered into force November 8, 1980. 32 UST 2919. TIAS 9887.

International express mail agreement, with

Memorandum of understanding concerning the operation of the INTELPOST field mail, with details of implementation. Signed at Beijing and Washington January 17 and February 5, 1987; entered into force March 1, 1987.  
TIAS

## PRIVILEGES AND IMMUNITIES

Agreement relating to privileges and immunities for the respective diplomatic missions in Washington and Beijing. Exchange of notes at Washington January 5, 1981; entered into force January 5, 1981.  
TIAS

## REMOTE SENSING

Memorandum of understanding relating to establishment and operation of a Landsat system, with annex. Signed at Washington and Beijing July 2 and 8, 1985; entered into force July 8, 1985.  
TIAS

## SCIENTIFIC COOPERATION

Agreement on cooperation in science and technology, with exchange of letters. Signed at Washington January 31, 1979; entered into force January 31, 1979.  
30 UST 35; TIAS 9179

Extension:  
January 12, 1984

## TAXATION

Agreement relating to relief from double income tax on shipping profits. Exchange of letters at Beijing November 18, 1981; entered into force November 18, 1981; effective January 1, 1981.  
TIAS 10297.

Agreement with respect to mutual exemption from taxation of transportation income of shipping and air transport enterprises. Signed at Beijing March 5, 1982; entered into force September 23, 1983; effective January 1, 1981.  
TIAS

Agreement for the avoidance of double taxation and the prevention of tax evasion with respect to taxes on income, with protocol exchange of notes. Signed at Beijing April 30, 1984; entered into force November 21, 1986.  
TIAS

Protocol concerning the interpretation of paragraph 7 of the protocol to the agreement for the avoidance of double taxation and the prevention of tax evasion with respect to taxes on income of April 30, 1984. Signed at Beijing May 10, 1986; entered into force November 21, 1986.  
TIAS

## TOURISM

Memorandum of understanding on the development of bilateral tourism relations. Signed at Beijing August 5, 1982; entered into force August 5, 1982.  
TIAS 10426.

## TRADE AND COMMERCE

Agreement on trade exhibitions. Signed at Beijing May 10, 1979; entered into force May 10, 1979.  
30 UST 4472; TIAS 9470.

Agreement on trade relations. Signed at Beijing July 7, 1979; entered into force February 1, 1980.  
31 UST 4651; TIAS 9630.

Arrangement relating to a visa system for exports to the United States of cotton, wool and manmade fiber textiles and textile products. Exchange of letters at Washington February 16, 1984; entered into force February 16, 1984.  
TIAS

Arrangement concerning trade in certain steel products, with appendices and exchange of letters. Signed at Washington February 25, 1987; entered into force February 25, 1987; effective January 1, 1986.  
TIAS

Agreement for orderly trade in ammonium paratungstate and tungstic acid, with annexes. Signed at Washington September 28, 1987; entered into force September 28, 1987; effective October 1, 1987.  
TIAS

## VISAS

Agreement relating to the reciprocal issuance of visas to crew members of aircraft and vessels. Exchange of notes at Beijing January 7, 1981; entered into force January 7, 1981.  
32 UST 4533; TIAS 9965.

Agreement relating to reciprocal facilitation of visa issuance. Exchange of notes at Beijing December 2, 1985; entered into force January 2, 1986.  
TIAS

# ACTIVE GOVERNMENTAL AGREEMENTS IN SCIENCE AND TECHNOLOGY COOPERATION BETWEEN CHINA AND THE UNITED STATES

Agreement/protocol	Signed	Chinese agency	US agency
Understanding on Exchange of Students and Scholars	10/78	Ministry of Education, Chinese Academy of Social Sciences (CASS), State Science and Technology Commission (SSTC)	US Information Agency, Dept. of Education, National Science Foundation (NSF), National Academy of Sciences, National Endowment for the Humanities
Understanding on Agricultural Exchange	11/78	Ministry of Agriculture, Animal Husbandry, and Fisheries	US Dept. of Agriculture, US Geological Survey (USGS) and Fish and Wildlife Service, both of the Dept. of Interior
Understanding on Space Technology (A protocol is currently under negotiation)	1/31/79	Chinese Academy of Space Technology (Ministry of Aeronautics) and Chinese Academy of Sciences	National Aeronautics and Space Administration (NASA)
Implementing Accord on Cooperation in the Field of High Energy Physics	1/31/79	Initially SSTC, now CAS	Department of Energy
Protocol on Cooperation in the Field of Metrology and Standards	5/8/79	State Bureau of Metrology	National Bureau of Standards (Dept. of Commerce)
Protocol on Cooperation in the Field of Atmospheric Science and Technology	5/8/79	State Meteorological Administration	National Oceanic and Atmospheric Administration (NOAA) & NSF
Protocol on the Field of Marine and Fishery Sciences and Technology	6/8/79	National Bureau of Oceanography; Ministry of Agriculture, Animal Husbandry, and Fisheries	NOAA; NSF
Protocol on Cooperation in the Science and Technology of Medicine and Public Health	5/22/79	Ministry of Public Health	National Institutes of Health (Dept. of Health and Human Services)
Protocol S&T Cooperation in the Earth Sciences	1/24/80	Chinese Academy of Geological Sciences	USGS; NSF
Protocol for S&T Cooperation in Earthquake Studies	1/24/80	Chinese State Seismological Bureau	USGS; NSF
Protocol for S&T Cooperation in the Field of Environmental Protection	2/5/80	National Environmental Protection Agency (under the State Council)	US Environmental Protection Agency
Protocol on Cooperation in the Basic Sciences	12/10/80	CAS and CASS	NSF
Protocol on Cooperation in the Field of Building Construction and Urban Planning Science and Technology	10/17/81	Ministry of Urban and Rural Construction and Environmental Protection	Department of Housing and Urban Development
Protocol on Cooperation in Nuclear Safety Matters	10/17/81	National Nuclear Safety Administration (earlier handled by SSTC)	Nuclear Regulatory Commission
Protocol on S&T Cooperation in the Study of Surface Water Hydrology	10/17/81	Bureau of Hydrology (Ministry of Water Conservation)	USGS (DOI)
Cooperation in the Fields of Nuclear Physics and Controlled Magnetic Fusion Research	5/11/83	SSTC	Dept. of Energy
Cooperation in Aeronautical Science and Technology	5/11/83	Chinese Aeronautical Establishment (Ministry of Aeronautics)	NASA
Protocol on Cooperation in Science and Technology of Transportation	5/11/83	Ministry of Communications	Department of Transportation
Protocol on Cooperation in the Field of Scientific and Technical Information	5/8/79	Institute of Science and Technology Information of China (ISTIC), part of SSTC	National Technical Information Service (Dept. of Commerce)
Protocol on Cooperation in the Field of Management of Industrial Science and Technology	5/79	State Economic Commission, SSTC, Ministry of Education	Department of Commerce
Protocol on Cooperation in Statistics	7/24/84	State Statistical Bureau	Bureau of the Census (Dept. of Commerce)
Protocol for Scientific and Technical Cooperation in Surveying and Mapping Studies	4/16/85	National Bureau of Surveying and Mapping (SSTC)	USGS/Defense Mapping Agency
Protocol on Cooperation in the Field of Fossil Energy Research and Development	4/16/85	Ministry of Coal Industry	Department of Energy
Protocol on Cooperation in Scientific and Technological Research and Laboratory Activities in the Field of Water Resources and Related Studies	4/9/86	Ministry of Water Resources and Electric Power	Corps of Engineers (Dept. of the Army)
Protocol on Cooperation in the Field of Telecommunications Science and Technology	5/16/86	Ministry of Posts and Telecommunications	Department of Commerce
Protocol on Cooperation and Exchanges in the Field of Conservation of Nature	11/19/86	Ministry of Forestry	Department of the Interior
Protocol on Cooperation in Railway Science and Technology	12/15/86	Ministry of Railway	Department of Transportation

NOTE: Since the memoranda of understandings dealing with United and with Data, respectively, have not yet been concluded at the ministerial level, China does not regard them as having

# APPENDIX B

## OPIC Insured Investment in China - FY 1988

INVESTOR	PROJECT	INSURED INVESTMENT	LARGEST SINGLE COVER
Cabot Corporation	Carbon Black	5,220,000	10,212,000
Cargill Corporation	Cottonseed Processing	4,602,780	6,090,000
Citibank, N.A.	Banking	32,400	32,400
Coca-Cola Holdings (Asia)	Soft Drink Concentrate	4,500,000	4,500,000
Continental Grain Co	Livestock, Poultry Feed	2,700,000	8,100,000
Continental Grain Co	Feed Mill	720,000	2,160,000
H.B. Fuller Company	Adhesives	1,197,000	3,590,000
Ingersoll-Rand Company	Rock Drilling Equipment	1,575,000	4,500,000
Ingersoll-Rand Company	Air Compressors	1,395,000	4,185,000
Lump Insulator Company	Insulators	378,000	470,700
McCormick & Company, Inc.	Seasoning & Food Products	963,900	2,457,500

# APPENDIX C

## Export-Import Bank Loans for China

Fiscal Year	Importer	Loan Value (Millions)	Interest Rate*	Intermediary Bank	Purpose
1981	Combustion Engineering	27.7	8.75%	None	Power Generating Equipment & Services
1981	Westinghouse	28.7	8.75%	None	Power Generating Equipment & Services
1986	General Electric	65.6	8.8%	None	Two Coal-fired Power Plants
1987	Occidental Petroleum	28.2	7.4%	None	Coal Mining Equipment
1987	Bechtel Group	8.9	7.4%	None	Engineering Services
1988	Firestone	21.5	7.4%	First Chicago	Tire factory
1988	Carrier Carrier	6.3 .9	7.4% 7.4%	MC & Shanghai MC & Shanghai	Container Refrigeration Units (Same Project)
1988	Oxytech	2.3	7.4%	First Chicago	Potassium Hydroxide Manufacturing facility
1988	Combustion Engineering and Sargent & Lundy	151.0	7.4%	None	Boiler for Coal-fired Power Plant Engineering & Procurement for Power Plant
1988	Occidental Chemical	10.0	8.3%	Banque Indosuez	Paste PVC Plant
1989	Corning	80.2	7.4%	None	Equipment & Engr. for Glass factory
1989	Corning	19.7	8.3%	None	(Same)
1989	PMC Industries	47.7	8%	None	Steel Tube Plant

\*In the case of intermediary loans, this is the rate charged the Chinese borrower.

Eximbank Activity in China  
(FY 1989)

I. AUTHORIZED LOAN AND GUARANTEE CASES FOR CHINA (FY 1989 YEAR TO DATE)

Country	Code	Product	Applicant	Exporter	Buyer	Obligor	Expt Value	Loan Value	Gtee Value	Auth Date
China	AP060637XX	I.V. Glass Plant	Bank of China	Corning Glass	Shenzhen Color	Bank of China	117.6	99.9	0.0	10/03/88
China	AP0606481XX	Seamless Tube M	Bank of China	PHC Indus	Ilamjin Genl Se	Bank of China	56.1	57.4	0.0	11/03/88
						Totals	\$173.7	\$147.6	0.0	

II. PENDING FINAL AUTHORIZED CASES FOR CHINA

Country	Code	Product	Applicant	Exporter	Buyer	Obligor	Expt Value	Loan Value	Gtee Value	Appl Date
China	AP061114XX	Shanghai Metro	Bank of China	Genl Railways	Shanghai Metro	Bank of China	26.0	11.7	14.3	3/13/89
						Totals	\$26.0	\$11.7	\$14.3	

III. OUTSTANDING PRELIMINARY COMMITMENT CASES FOR CHINA

Country	Code	Product	Applicant	Exporter	Buyer	Expt Value	Loan Value	Gtee Value	PC Exp Date
China	PC010657XX	Electric Power G	Genl Elect Co.	Genl Elect Co.	Dong Fang Elect	77.3	65.7	0.0	07/07/89
China	PC010658XX	Corn Processing	Price-Chen Intl	Andersen Intl	Qinhuangdao Pri	2.5	2.2	0.0	11/23/89
China	PC010889XX	Telecommunication	AT&T Long Li	AT&T Tech I	Posts & Telecom	25.4	21.6	0.0	07/12/89
China	PC061043XX	Radial Tire Prod	King Yip Corp	Firestone	Dong Feng Tire	30.0	25.5	0.0	10/13/89
					Totals	\$135.2	\$115.0	0.0	

IV. PENDING PRELIMINARY COMMITMENT CASES INCLUDING DUPLICATES FOR CHINA

Country	Code	Product	Applicant	Exporter	Buyer	Expt Value	Loan Value	Gtee Value	Appl Date
China	PC060853XX	Ertan Hydro Proj	Marza Eng. Co.	Marza Eng. Co.	Ertan Hydroelec	30.0	25.5	0.0	12/05/88
China	PC060981AX	Petroleum Coker	Combustion Eng.	Lumax Crest.	Shanghai Gaoqia	30.0	25.5	0.0	02/06/89
China	PC060981XX	Petroleum Coker	Foster Wheeler	Foster Wheeler	Shanghai Gaoqia	30.0	25.5	0.0	01/19/89
China	PC061049AX	Offshore Oil Pro	Texas Commerce	Various	China Natl Offs	200.0	170.0	0.0	05/04/89
China	PC061049XX	Offshore Oil Pro	Hudson Eng Div	Hudson Eng Div	Wanhai West Oil	117.6	100.0	0.0	02/13/89
China	PC061146XX	Telecommunication	AT&T Long Li	AT&T Long Li	Admin of Poste	40.8	34.7	0.0	03/27/89
China	PC061254XX	Radars & Approac	Westinghouse El	Westinghouse El	China Aviation	120.5	102.4	0.0	04/28/89
China	PC061262XX	Vehicle Fuel Con	Rix Indus	Rix Indus	Sichuan Air Sep	4.1	3.5	0.0	05/01/89
China	PC061271XX	Mem. Cell Tech	Oxytech Sys	Oxytech Sys	Guangdao Chemc	10.1	8.6	0.0	05/05/89
China	PC061315XX	Nuclear Power	Westinghouse El	Westinghouse El	Guangdong Nucl	2.6	2.2	0.0	05/22/89
China	PC061316XX	Cars and Vans	Chrysler Corp	Chrysler Corp	China City Taxi	26.0	22.1	0.0	05/23/89
					Totals	\$466.1	\$394.5	0.0	

(excl. duplicates)



## APPENDIX D

### Trade and Development Program Projects in China

#### FY 89

Great Wall Aluminum Project: This study (\$1.5 million) will determine the technical and financial feasibility of the Great Wall Aluminum project, a \$2 billion complex in Henan Province for the refining, smelting and fabrication of aluminum and aluminum products. The grant was awarded to the China National Nonferrous Metals Corporation. The selection process will begin in June, 1989.

Mofert Computer Training (89-322D): Training (\$220,000) for Computer Center staff of the Ministry of Foreign Economic Relations and Trade in use of computer-based decision support systems and in wide-area network design and implementation. The selection process is underway.

Beijing Municipal Insurance Company (BMIC) Automation: A study (\$432,000) to design an automated management system for BMIC as a pilot to automation of the People's Insurance Company of China. Selection process is underway.

Shanghai Comprehensive Transportation Planning Phase II(a): Study (\$500,000) involves using the computer model data developed in Phase I (see FY 87) to test various transportation improvement projects contemplated by the Shanghai government.

#### FY 88

Bohai Offshore Oil: The study (\$645,000 for Phase I and \$530,000 for Phase II) involves geological/geophysical analysis (Phase I) and planning of surface facilities (Phase II) for an oil field in the Bohai Sea. Gustavson Associates has nearly completed the Phase I study.

Coal Training: TDP is funding a \$125,000 training program on underground coal mining for the Ministry of Energy Resources. Kaiser Engineers is arranging the training program.

Disposable Syringe-Zibo: The study (\$200,000) involves a new factory to produce sterile, disposable plastic syringes in Zibo, Shandong Province. The selection process is delayed.

E. China Sea Gas: The study (\$660,000) involves planning for the development of a gas field in the East China Sea off the coast of Shanghai. Bechtel carried out the study.

Hainan Air Traffic Control: The study (\$375,000) covers planning and conceptual design for an air traffic control center at Sanya on the southern tip of Hainan Island. Lockheed Electronics has been selected to carry out the study.

Lithium Batteries: The study (\$150,000) involves a facility in Urumqi, Xinjiang Autonomous Region, to produce lithium batteries. Arthur D. Little has been selected to conduct the study.

MOFERT Technology Transfer Training: TDP is funding a \$115,000 training program on technology transfer and export licensing for MOFERT. The U.S.-China Business Council administered the training program.

Ningbo Port: The consultancy (\$330,000) involved a new three-berth port development at Beilun terminal in Zhejiang Province. Parsons Brinckerhoff carried out the consultancy.

Qinghai Petroleum: The study (\$500,000) involves review of seismic and other data relating to an oil field in Qinghai Province. Western Geophysical is carrying out the study.

Shandong Highway: The consultancy (\$225,000) concerns a highway to be built from Jinan to the port of Qingdao in Shandong Province. Louis Berger is carrying out the consultancy.

Shanghai Medical Instruments: The study (\$220,000) is examining the upgrading of an existing factory in Shanghai producing medical electronics, such as ECG's, ultrasonic scanners and cardiac pacemakers. Stearns Roger is carrying out the study.

Shanghai MOS Reagents: The study (\$150,000) is examining the upgrading of production of MOS reagents at an existing factory in Shanghai. Kaiser Engineers is carrying out the study.

Sichuan Highway: The consultancy (\$360,000) concerns a highway to be built from Chengdu to Chongqing in Sichuan Province.

Tantalum Seminar: TDP funded a technical seminar on tantalum processing in Xinjiang Autonomous Region.

Tianjin Tylenol: TDP is providing partial funding (\$300,000) for a study by Johnson & Johnson of an investment in a plant to produce Tylenol in Tianjin.

Wood Products Demonstration: The study (\$100,000) will look at the feasibility of constructing a demonstration building in Beijing utilizing U.S. wood products. The building also would be used as a seminar center for the U.S. wood products industry. The National Forest Products Association has been selected to carry out the study.

## FY 87

Automotive Sector: The study (\$500,000) is examining the prospects for future cooperation between the U.S. and Chinese automotive sectors. The University of Michigan has recently completed the study and the results are under review.

Baoshan Management Information System: The study (\$650,000) from TDP plus \$50,000 from the Ministry of Metallurgy) involved a management information system for the Baoshan steel complex. UEC carried out the study.

Electronics Seminar: TDP provided funding (\$91,500) for a seminar on management planning for the Ministry of Electronics Industry.

Gongzhuling Packing Adhesives: The study (\$290,000) involves the renovation of an existing plant in Jilin Province to produce a wide range of packing adhesives. Swift Adhesives is carrying out the study.

Graphite Electrodes: The study (\$150,000) involves a new plant to produce ~~graphite~~ electrodes in Kalfeng, Henan Province. Union Carbide is carrying out the study.

Jiangnan Cement Plant: The study (225,000) will determine the feasibility of a new 4000 ton/day facility at an existing cement works in Nanjing, Jiangsu Province. Kaiser Engineers is carrying out the study.

Shanghai Comprehensive Transportation Planning: Phase I of the study (\$630,000) involves development of a computer model to help plan Shanghai's transportation system. See FY 1989 for description of Phase II(a) of the study. Parsons Corporation (Barton-Aschman) is carrying out both phases of the study.

Shanghai Sewerage: The consultancy (\$380,000) examined the design of the sewer outfall, where a new diversion line will empty into the Yangtze River. Parsons Corporation (Engineering Science) carried out the consultancy.

Shanghai Tire Factory: The study (\$176,000) involves the expansion of a tire factory in Shanghai. Firestone is carrying out the study.

Sichuan Gas: The study (\$550,000) involves gas well head testing in Sichuan Province. SSI is carrying out the study.

Teleteaching: The study (\$225,000) involved demonstration of a newly-developed technology using PC's, specially designed modems and special software in an interactive real-time voice/graphics/video communication system. Teleteaching International carried out the study.

Tianjin Economic Development Area: The study (\$467,000) involves a master plan for an economic development zone in Tianjin. United Planning Company recently completed the study and investment recommendations are under review by the Tianjin authorities.

Zhongyuan Pharmaceutical Factory: The study (\$400,000) involved a new plant in Henan Province to produce vitamin C and other pharmaceuticals from corn. Davy McKee carried out the study.

### FY 86

Automotive Investor: TDP is supplying partial funding (\$200,000) for a feasibility study on major investments in China's automotive industry by General Motors Corporation.

Capital Hospital: The study (\$200,000) helped establish an energy conservation model for the Maanshan Iron and Steel Plant in Anhui Province. The International Institute for Energy Conservation carried out the study.

Xinhua News Agency: The study (\$350,000) made recommendations for word processing and telecommunications systems for the new Beijing headquarters building of the Chinese national news agency. Phoenix Associates carried out the study.

Shanghai Cement Grinding Plant: The study (\$150,000) involved the feasibility of a plant to produce cement in Shanghai. Kaiser Engineers carried out the study.

Shanghai Petroleum Coke Plant: The study (\$325,000) involved the feasibility of a plant to produce petroleum-based regular and needle coke in Shanghai. ~~Foster Wheeler~~ carried out the study.

Ansai Oil Field: The study (\$650,000) dealt with the problem of maximizing oil production from low permeability reservoirs in Shaanxi Province. CER carried out the study.

Luhu Oil Field: The study (\$580,000) provided recommendations for a well stimulation program to increase production at this oil field location in Shandong Province. Core Laboratories carried out the study.

Zinc and Aluminum Castings: TDP is supplying partial funding (\$150,000) for a study of a proposed zinc and aluminum castings joint venture in Hebei Province involving Klowa Corporation.

Conversion of Oil-Fired Power Plants: The study (\$600,000) examined the conversion of two oil-fired power plants to coal. Burns and Roe carried out the study.

Shenyang Toxic Waste: The study (\$325,000) involves the disposal of toxic waste from industrial facilities in and around Shenyang. Ecology and Environment is carrying out the study.

Steel Building System: TDP supplied partial funding (\$150,000) for a study of a proposed steel building systems joint venture involving Thyssen Co.

Flue Gas Desulfurization: The study (\$143,000) involved a spray dryer FGD unit and a roasting and calcining process facility for the Quzhou Chemical Industry Complex in Zhejiang Province. Kaiser Engineers carried out the study.

#### FY 85

Huangling Coal Mine: The study (\$550,000) examined the feasibility of using US room and pillar mining techniques in a coal mine in Shaanxi province. A joint venture of Kaiser Engineers and Consolidation Coal carried out the study.

Yuxian Coal Gasification: The study (\$750,000) addressed how to gasify coal at the mouth of the mine in Hebei Province and transport the gas to Beijing. A joint venture of Lummus Crest and Kaiser Engineers carried out the study.

Shenzhen Airport: The study (\$800,000) covered the financing and sizing of a new international airport in the Shenzhen Special Economic Zone. A Joint venture of Parsons International and Lockheed Air Terminal carried out the study.

Shanghai Corn Fermentation Complex: The study (\$425,000) examined how to set up a corn wet mill plant to produce starch, alcohol, high fructose corn syrup, and citric acid. Fluor Daniel carried out the study.

Shanghai Solid Waste Disposal: The study (\$250,000) made recommendations on how to set up a collection and disposal system for 1,000 tons per day of solid waste. Klockner carried out the study.

Wujing Trigenation: The study (\$600,000) examined construction of a complex in Shanghai to produce coal gas, steam, electricity and synthetic gas. Bechtel Corporation carried out the study.

FY 84

Meishan Multichannel Carrier Plant: The study (\$410,000) covered the modernization of a telecommunications equipment plant located in Sichuan Province. Pacific Telesis carried out the study.

Luoyang Silicon Materials Plant: The study (\$100,000) helped determine the equipment and materials necessary to expand silicon production at the plant in Henan Province. Stearns Catalytic carried out the study.

Maanshan Wheel and Tire Plant: The study (\$200,000) made recommendations on how to improve the quality of railway wheels and tires at an existing plant in Anhui Province. Rust Engineering carried out the study.

Shanjiiasi Heavy Oil Reservoir: The study (\$280,000) developed a plan to recover heavy oil from the Shanjiiasi reservoir in Shandong Province. SAIC carried out the study.

## APPENDIX E

### U.S. Licensing Agreements with China

#### SELECTED U.S. LICENSING AGREEMENTS WITH CHINA

Product or process	Firm	Date	Description
<i>Automotive parts</i>			
Diesel engines	Cummins Engine	1981	10-year agreement signed with TECHIMPORT for Chongqing MMBI plant
Automotive thermostats	Standard Thomson, Allegheny Industries	1982	10-year agreement with No. 2 Automobile Plant, Shiyang, soon to be turned into a joint venture
Turbochargers	Hobart Engineering, Cummins Engine	1982	Signed with TECHIMPORT for Wuli Plant
<i>Electrical equipment</i>			
Power capacitor	McGraw-Hill	1979-80	Signed with TECHIMPORT for MMBI capacitor plant in Xian
Copper rod forming technology	General Electric	1981	10-year agreement signed with TECHIMPORT for MMBI Harbin Cable Factory
Power-plant air-preheater	Combustion Engineering	1981	15-Year agreement with MMBI for Shanghai, Harbin and Sichuan plants
Thermal power-plant boilers (300 and 600 MW)	Combustion Engineering	1981	15-Year agreement with MMBI for Shanghai, Harbin, and Sichuan plants
Thermal power-plant turbine generators (300 and 600 MW)	Westinghouse	1981	15-Year agreement with MMBI for Shanghai, Harbin, and Sichuan plants; first agreement signed with FOURMEX
Molded-case circuit breakers	Westinghouse	1982	Signed with TECHIMPORT for Huadong Switchgear Plant, Shanghai
Thyristors for high-voltage direct current transmission lines	General Electric	1983	7-year agreement with MMBI at Xian Rectifier Plant
<i>Mining and minerals processing</i>			
Ball mills	Alto-Chalmers	1980	China to manufacture one ball mill for Yongping copper mine at Shenyang
Water gel explosives for coal mining	DuPont	1980	10-year agreement signed with TECHIMPORT for Coal Mining plant in Huibei
Vibrating screen	Tabor Machinery, Subduary, Roberts and Schaefer Co.	1981	8-year agreement with MMBI for 10-foot screens at Anshan
Dewatering centrifuges	Bird Machinery	1982	9-year agreement with MMBI at Luoyang Mining Machinery Plant
Vacuum and shiver-type filters	Emco, Subduary, Baker Int'l	1983	9-year agreement with MMBI
<i>Petrochemicals</i>			
Acrylonitrile	Sohio	1973	Plant in Shanghai; 50,000 tpy
Aromatic extraction	UOP	1973	Shanghai-Jinshan
Aromatic extraction	Atlantic Richfield	1973	Liaoyang
Ethylene	C-E Lummus	1973	Yanshan; 300,000 tpy
Polypropylene	Amoco	1973	Liaoyang; 35,000 tpy
Ammonia	Kellogg	1973-74	11 plants around China; 300,000 tpy
Ethylene glycol	Soennik Design	1974	Yanshan; 60,000 tpy
Alkylbenzene	UOP	1975	Nanning; 50,000 tpy
Aromatic extraction	UOP	1975	Yanshan, Beijing; plant constructed by China
Benzene catalytic desulfurization	Air Products & Chemicals	1975	Yanshan; 100,000 tpy
Aromatic extraction	UOP	1976	Tianjin
Terephthalic acid	Amoco	1977	Yanshan; 36,000 tpy
Aromatic extraction	UOP	1978	3 plants in Nanning, Shanghai-Jinshan, and Shengji
Dewaxing of oil	Mobil Oil	1978	Shengji
Ethylene	C-E Lummus	1978	3 plants at Nanning, Shengji, and Jinshan - in progress

Ethylene	Stoche & Webster—	1978	Daqing; 300,000 tpy
Hydrocracking of heavy oil	Union Oil	1978	4 facilities: Maoming, Shanghai, and 2 at Nanjing
Hydrotreating	Union Oil	1978	Shengli—
Metacresols	Hercules & UOP	1978	Yanzhan; construction not yet begun
Oxoalcohols	Union Carbide	1978	Daqing and Shengli; 70,000 tpy
Polyethylene (high-density)	Union Carbide	1978	Shengli; 140,000 tpy
Synthesis gas generation	Tesaco	1978	For use in 3 ammonia plants in Zhejiang, Ningxia, Xinjiang, and an unlimited number of others.
Synthesis gas generation	Tesaco	1978	For Shengli oxoalcohol plant
Terephthalic acid	Amoco	1978	Shanghai—Jinshan; 200,000 tpy
Cautic soda chlorine	Diamond Shamrock	1979	Shengli; 200,000 tpy
Terephthalic acid	Amoco	1979	Nanjing; 450,000 tpy
Alkylation of gasoline	Phillips Petroleum	1983	3 refineries in Tianjin, Shanghai and Zhejiang; 1,700 barrels per day; signed with SINOPEC
Ethylene glycol	Scientific Design	1983	Nanjing; 200,000 tpy
Lubricating oil additives	Lubrizol	1983	Jinzhou No. 6 Petroleum Factory
<b>Petroleum equipment</b>			
Jack-up drilling rig, (200 feet)	Bethlehem Steel	1981	3-year contract with Guangdong Ship Building Corporation in joint venture with Wah-Chang, Singapore
Rock drill bits	Hughes	1981	10-year agreement signed with MACHIMPEX for Jangnan plant, Hubei Province under Petroleum Ministry
Equipment for offshore drilling rigs (6,000–8,000 meters depth)	National Supply, ARMCO	1983	8-year contract with Lanzhou Petroleum Machinery Plant under MMBI
Well-head equipment	McEvoy	1983	7-year agreement with MMBI in Shanghai
<b>Other License agreements</b>			
Pressure monitoring instruments	Rosemount, Emerson Electric	1979	For Xian Instrument Factory
Aircraft pumps	Sperry-vickers	1980	NA
Axial piston pumps	Sperry-vickers	1980	NA
Hydraulic valves	Sperry-vickers	1980	Agreement signed with TECHIMPORT for Yuci Factory, Shanxi
Television gas bulbs	Corning	1980	Signed with Shanghai local authorities
Combine harvesters	John Deere	1981	10-year agreement signed with TECHIMPORT for MMBI plants in Jiamusi and Kaifeng
Valve actuation	Limitorque	1981	10-year agreement signed with TECHIMPORT for MMBI plant in Tianjin
Metal-forming presses	Verson Machine Tool	1981	10-year agreement with MMBI for Jinan No. 2 Machine Tool Factory
Plastic telephone cable	Essex Wire, United Technologies	1982	10-year agreement signed with MACHIMPEX for Chengdu Cable Plant under Ministry of Posts and Telecommunications
External & internal gear pumps for medium and high pressure applications	Sperry-vickers	1983	Several different agreements
16-Bit microcomputers	General Robotics Corporation	1983	Agreement signed with MACHIMPEX for Tianjin No. 5 Radio Factory

MACHIMPEX: China National Machinery Import and Export Corporation

MMBI: Ministry of Machine Building Industry

MW: Metallurgy

SINOPEC: China National Petrochemical Corporation

TECHIMPORT: China National Technical Import Corporation